



DEPARTMENT OF
ECOLOGY
State of Washington

**Addendum to
Quality Assurance Project Plan**

**Aquatic Plant Monitoring in
Washington Lakes and Rivers**

August 2011

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Publication Information

Addendum

This addendum is an addition to a Quality Assurance Project Plan. The addendum is not a correction (errata) to the original plan.

This addendum is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/1103106Addendum.html

Ecology's Activity Tracker Codes for this study are 10-161 and 01-650.

Original Publication

Quality Assurance Project Plan: Aquatic Plant Monitoring in Washington Lakes and Rivers

Publication No. 11-03-106.

The Quality Assurance Project Plan is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/1103106.html. Data for this project will be available on Ecology's Environmental Information Management website at www.ecy.wa.gov/eim/index.htm. Search Study AMS002B.

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DEPARTMENT OF ECOLOGY
Environmental Assessment Program

August 4, 2011

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SUBJECT: Addendum to Quality Assurance Project Plan for Aquatic Plant Monitoring in
Washington Lakes and Rivers

Activity Tracker Codes: 10-161 and 01-650
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This addendum adds the activity of collecting total phosphorus water samples to the Quality Assurance Project Plan for Aquatic Plant Monitoring in Washington Lakes and Rivers. Documenting phosphorus levels will provide additional information in determining the overall health status of the lakes sampled.

cc: Jenifer Parsons, Project Manager, Environmental Assessment Program
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Background and Program Objectives

Phosphorus is a critical nutrient required for all life. In appropriate quantities, phosphorus supports the primary algal production component of the lake food web. In many lakes, phosphorus is considered the “limiting nutrient”. This means that the available quantity of phosphorus controls the pace at which algae is produced in a lake. This also means that any modest increase in available phosphorus can cause rapid increases in algal growth – potentially leading to a reduction in the lake’s beneficial uses such as swimming and boating.

By adding sampling of total phosphorus to the Washington State Department of Ecology’s Aquatic Plant Monitoring Program, we can obtain important additional information on the status of lakes in Washington.

Sampling Methods

Ecology staff will visit lakes selected for aquatic plant monitoring from June through October. They will collect water samples for total phosphorus analysis from the deep spot of each lake. Samples will be collected in one of the following ways:

- With a discrete water sampler, at one meter in depth below the water surface for an epilimnetic sample. If a hypolimnetic sample is taken, it will be taken from one meter in depth from the lake bottom.
- From an integrating sampler (epilimnion only) such as the one used in the National Lakes Assessment survey (USEPA, 2009).

The following tables summarize the analytical method and containers used for samples collected.

Table 1. Laboratory sample container, preservation, analytical method, and holding time.

Parameter	Strata Sampled	Container	Sample Preservation ¹	Analytical Method	Method Detection Limit	Holding Time	Lab ²
Total Phosphorus	epilimnion, hypolimnion	A 125 mL clear wide mouth polyethylene	HCl to pH < 2	SM 4500-P F	5 ug/L	28 days	MEL

¹All samples kept on ice or stored at 4°C until delivery to the lab, or until filtered.

²Manchester Environmental Laboratory (MEL).

Quality Objectives

Measurement Quality Objectives

The Environmental Protection Agency defines Measurement Quality Objectives as *acceptance criteria* for the quality attributes measured by project data quality indicators. [They are] quantitative measures of performance...” (USEPA, 2002).

In practice, these are often the precision, bias, and accuracy guidelines against which laboratory Quality Control results are compared. Precision may be assessed by the analysis of laboratory duplicates or checking standard replicates and bias by comparing the mean of blank and checking standard results to known values. The acceptable levels listed in the table below will be applied to batch-level data and may be assessed by only a few Quality Control samples.

In addition, 10% of the lakes visited will have duplicate water samples collected for total phosphorus analysis. The 20 % RSD precision level will be applied to these results as well.

Table 2. Measurement Quality Objectives

Analyte	Precision (% relative standard deviation)	Bias (% deviation from true value)	Lower Reporting Limit
Total Phosphorus	20% RSD	5%	5 ug/L

Data Management

After a Quality Control review, results will be stored in EIM by March of the year following sample collection. Results will be shared by email to interested parties, including Ecology staff.

Table 3. Proposed schedule for completing field and laboratory work, and data entry into EIM.

Field and laboratory work	Due date	Lead staff
Field work completed	October, each year	Jenifer Parsons
Laboratory analyses completed	November, each year	
Environmental Information System (EIM) database		
EIM user study ID	AMS002B	
Product	Due date	Lead staff
EIM data loaded	March, each year	Dave Hallock
EIM quality assurance	April, each year	Maggie Bell-McKinnon
EIM complete	May, each year	Dave Hallock

References

USEPA, 2002. Guidance on Environmental Data Verification and Data Validation, EPA/240/R-02/004. U.S. Environmental Protection Agency, Washington, DC.

USEPA, 2009. National Lakes Assessment: A Collaborative Survey of the nation's Lakes. EPA 841-R-09-001. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, DC.